

IRON FIREMAN

AUTOMATIC COAL FIRING



For residential heating
plants and for commercial
heating or power boilers
developing up to 500
boiler horsepower

Consult your Iron Fireman dealer for latest data

"THE MACHINE THAT MADE COAL AN AUTOMATIC FUEL"

IRON FIREMAN MANUFACTURING COMPANY

CLEVELAND, OHIO

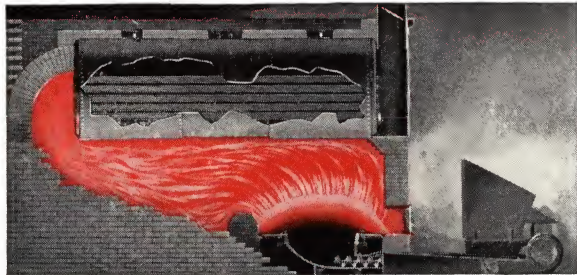
PORTLAND, OREGON

TORONTO, CANADA

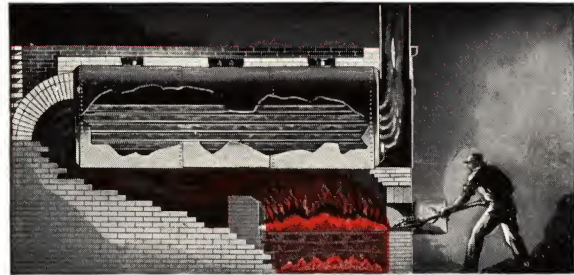
Branches or Subsidiaries: New York, Brooklyn, Chicago, Milwaukee, St. Louis, Montreal

Dealers in principal cities and towns in the United States and Canada. Representation in foreign countries

The principle of Iron Fireman "forced underfiring"



IRON FIREMAN FIRING. Small size, low cost coal fed to the fire from below. No smoke nuisance. No fuel waste. Steady, uniform boiler pressure, automatically controlled. Reduced labor costs.



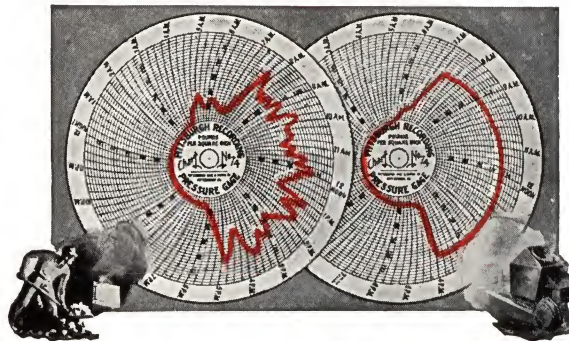
HAND FIRING. High priced coal thrown on top of the fire. Fuel waste from smoke and from coal that sifts through the grates, partially burned. Uneven boiler pressure. Constant labor required.

Iron Fireman "forced underfiring" is based on the scientific principle of feeding coal to the fire from below, under forced draft.

Green coal is slowly conveyed by a revolving worm from the hopper to the retort, which is directly beneath the incandescent fuel bed. The retort turns the flow of coal upward, and as the coal approaches the fire it is gradually heated. The volatile gases are distilled off in the presence of an excess of oxygen. As they pass upward through the incandescent fuel bed, they are ignited, consumed, and turned into useful heat.

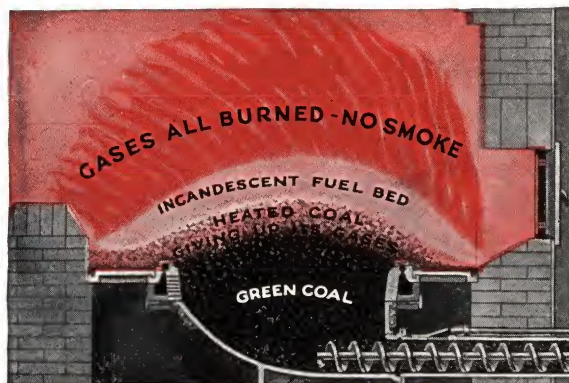
The four major advantages of Iron Fireman "forced

underfiring" are: (1) *Lower fuel costs.* Iron Fireman is especially designed to burn the smaller, cheaper sizes of coal, and to extract the maximum number of heat units per ton from the fuel. (2) *Reduced labor costs.* Iron Fireman is automatic in operation and requires but a minimum of attention. (3) *Steady, even heat or power.* Iron Fireman operates at the command of electric controls and feeds coal to the fire in just the proper amount to hold boiler pressure, or water, or room temperature, at any desired point. (4) *Eliminates smoke nuisance.* Volatile gases pass up through the fire and are thoroughly consumed.



HAND FIRING
With hand firing it is impossible to maintain even heat or boiler pressure. Temperatures fluctuate widely.

IRON FIREMAN FIRING
Temperatures do not fluctuate when Iron Fireman does the firing. Heat or boiler pressure is dependable, steady.

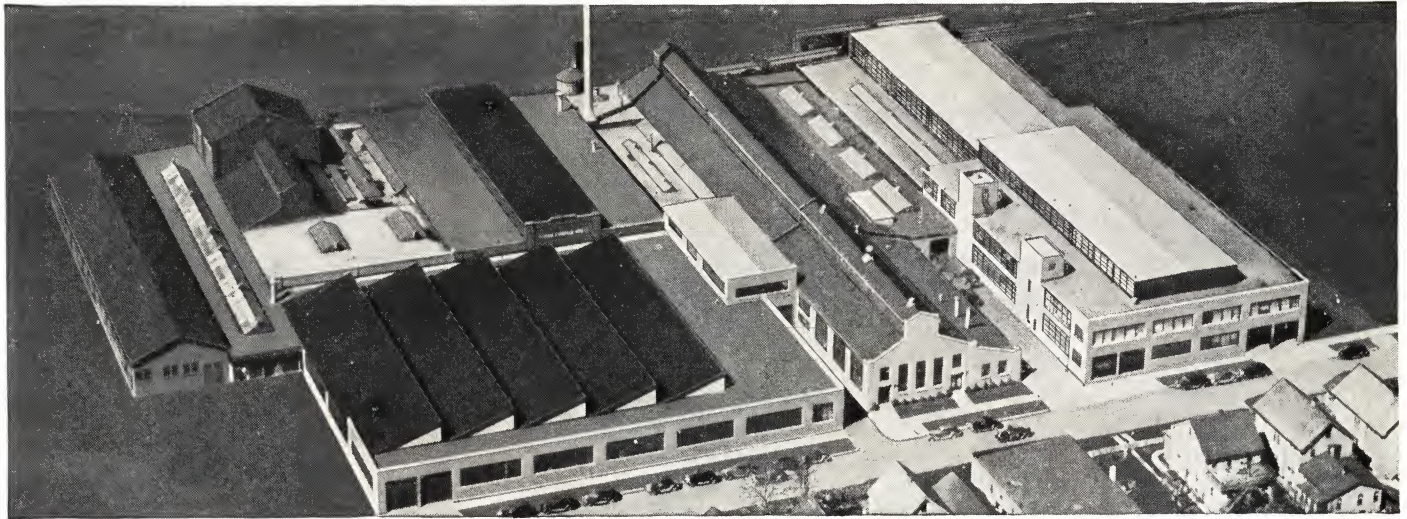


OBSERVE WHAT HAPPENS in the process of "forced underfiring." The feed worm forces coal upward, under the fire. Coal is slowly preheated, the gases thus released passing upward through the fire, where they are burned. Coked coal is burned when it reaches the incandescent fuel bed. No smoke nuisance. No fuel waste.



YOU SEE HERE why hand-firing is so wasteful. Green coal is thrown on top of hot fuel bed. Valuable gases are released immediately and pass up the stack unburned. Air supply is deficient. Unburned coal drops through into ash pit.

IRON FIREMEN—world's standard of stoker value



THE IRON FIREMAN PLANT AT CLEVELAND, OHIO



GEAR CASE TESTING DEPARTMENT

The IRON FIREMAN MANUFACTURING Co. has factories at Cleveland, Ohio; Portland, Oregon; Toronto, Canada. Factory branches or subsidiaries are located at New York, Brooklyn, Chicago, Milwaukee, St. Louis, Montreal. There are more than 1400 dealers in the United States, Canada, and foreign countries. A staff of factory engineers and sales representatives are maintained in the field at all times.

Reference to the commercial rating agencies or to the company's annual statement will show a well-balanced operation and

obvious stability. These matters are important to the purchaser of an automatic coal burner, who has the right to know the prospects of continued service-responsibility of the maker of the equipment he buys.

The Iron Fireman organization has grown to its present size and lead-

ership through success in the invention, design, production, and sale of automatic coal burners. First to recognize the dual opportunity of improved firing results and greater firing economy in the field of automatic coal firing, this company was also the first to successfully apply these advantages. Thousands of Iron Fireman owners are now enjoying the benefits of steady, even firing, automatically controlled, and at the same time are enjoying savings over former methods which aggregate many millions of dollars annually.

The IRON FIREMAN MANUFACTURING Co. recognizes that its continued success rests upon the satisfaction of its customers and to this end spares no efforts in providing the best product which can be produced at the lowest possible cost, consistent with sound business operations, capable of insuring a continuance of service to its users.



A MACHINE LINE

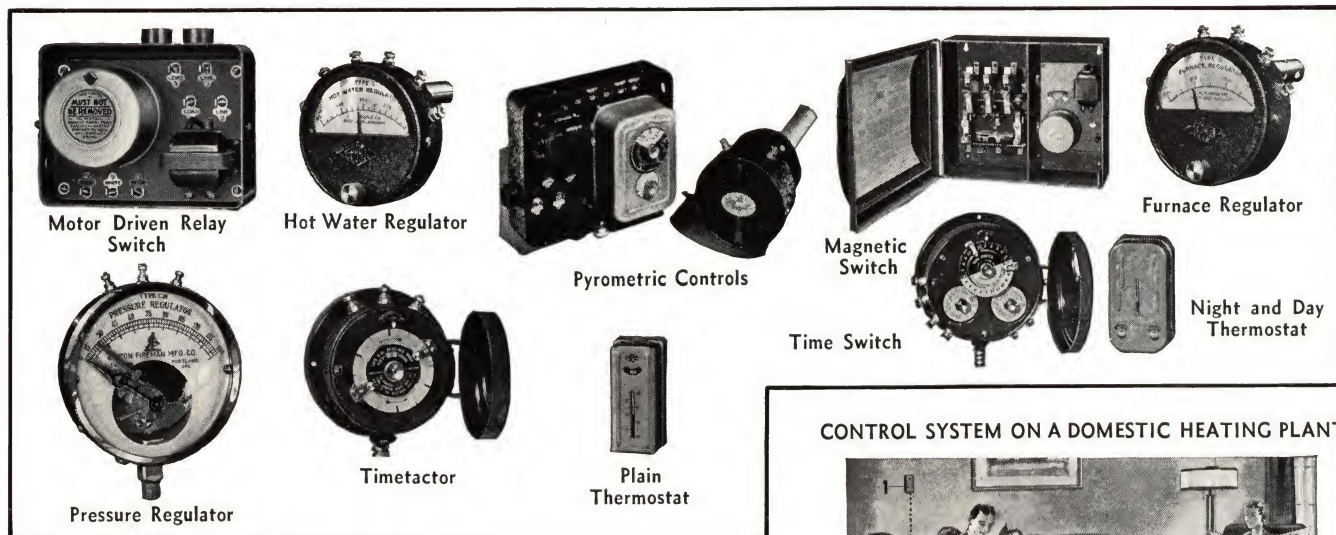


THE IRON FIREMAN PLANT AT TORONTO, CANADA



THE IRON FIREMAN PLANT AT PORTLAND, OREGON

An Iron Fireman installation provides complete firing control for homes and for commercial heating and power plants

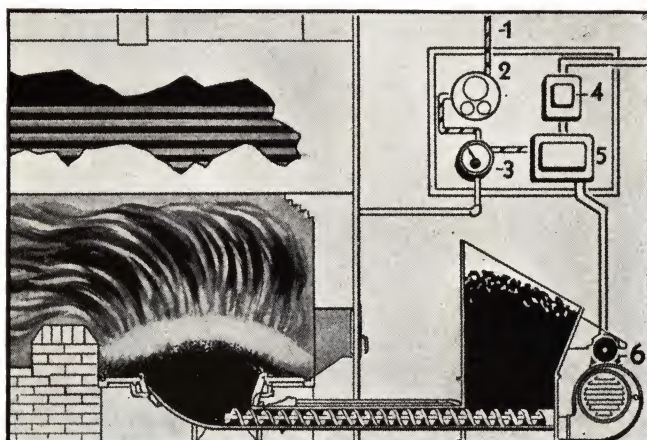


CONTROL SYSTEM ON A DOMESTIC HEATING PLANT



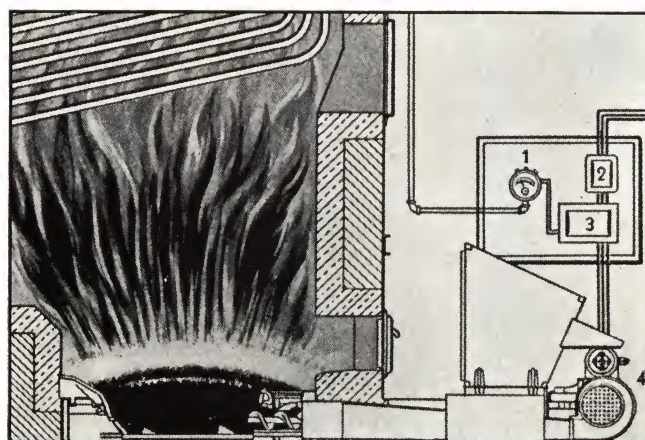
AN Iron Fireman installation is a complete automatic firing system, consisting of stoker unit and specialized controls which are carefully selected and installed in accordance with the exact requirements of each particular firing job. Temperature and steam pressure may be held at just the degree wanted—hour after hour, day after day. When the required temperature is reached, Iron Fireman banks the fire—the fire is not completely extinguished as is the case in most oil or gas burner installations. Instead, the banked, glowing coals retain heat and maintain unvarying temperature. When additional fuel is needed, controls flash the signal to the positive feed mechanism which replenishes the fire steadily and evenly. Iron Fireman heat is completely controlled heat. Controls are made for every type of plant.

CONTROL SYSTEM ON A HEATING BOILER



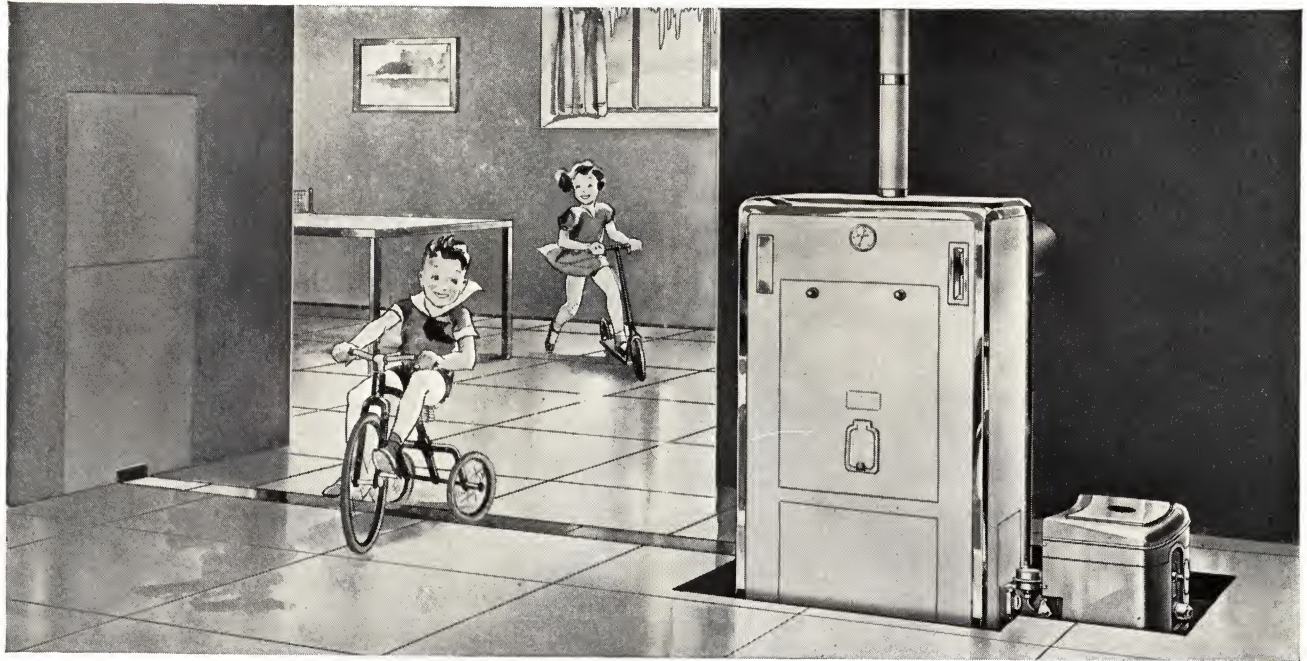
1. To Duplex (Night and Day) Thermostat. 2. Time Switch. 3. Pressure Regulator. 4. Line Switch. 5. Magnetic Switch and Relay. 6. Motor

CONTROL SYSTEM ON A POWER BOILER



1. Pressure Regulator. 2. Line Switch. 3. Magnetic Switch and Relay. 4. Motor

The Coal Flow Iron Fireman Feeds direct from coal bin to furnace



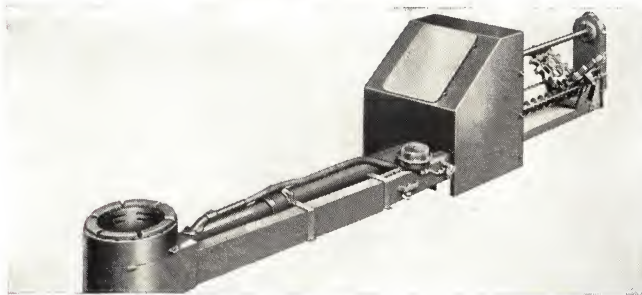
BITUMINOUS COAL FLOW MODEL

Available in various lengths up to 20 ft. Feeds coal direct from bin to fire. Models RF-20, RF-30, RF-40, RF-60. See page 5

BIN-FED models are available to fit practically every type of heating plant or basement arrangement. Coal is carried direct from main coal bin to boiler or furnace by a simple, quiet screw conveyor. Various lengths of coal conveyors are available, entering the

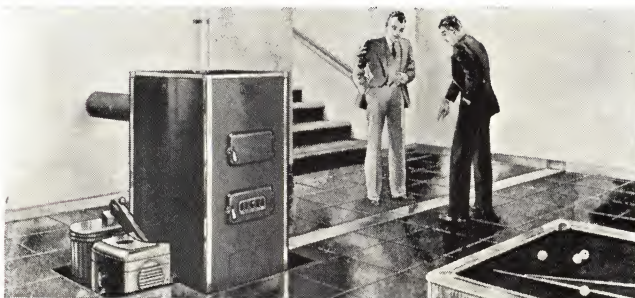
boiler or furnace from the front, rear, side, or at an angle. This wide flexibility makes possible installations to fit the most diverse requirements. Models for domestic heating plants and for heating or power boilers.

CHAIN DRIVE COAL FLOW



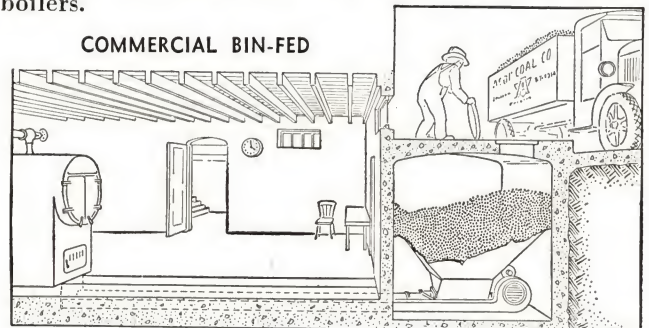
Available in various lengths up to 20 ft. For domestic models RL-20, RL-30, RL-40, RL-60. See page 5

ANTHRACITE COAL FLOW WITH AUTOMATIC ASH REMOVAL



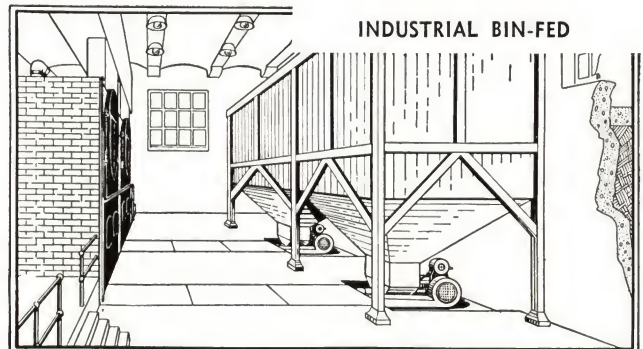
Available in various lengths up to 15 ft. Models RFAA-20, RFAA-35, RFAA-50. See page 6

COMMERCIAL BIN-FED



Available in various lengths up to 20 ft. For commercial models No. 2, No. 3, No. 4. See page 7

INDUSTRIAL BIN-FED



Available in various lengths up to 20 ft. For industrial models No. 4A, No. 5, No. 5A. See page 7. Also for Poweram models No. 4ACD, No. 5CD, No. 5ACD. See page 8

Domestic Stokers (Bituminous)

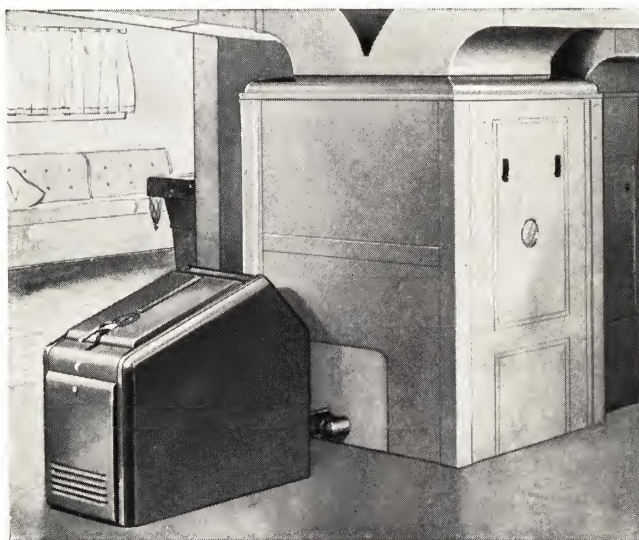
IRON Fireman is quickly installed in residential hot water, steam, vacuum, or warm air heating plants.

Installation may be made from the front, side, or rear, thus making for flexibility in setting to conform to floor plans.

These machines burn the smaller sizes of bituminous coal which are cheaper than the larger sizes used in hand-firing. A bituminous coal known in the trade as

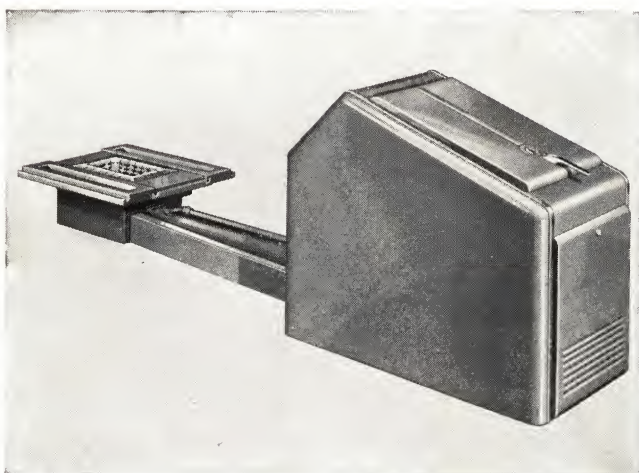
"washed pea" is recommended.

Detailed information regarding Iron Fireman automatic coal burners for residential use with bituminous coal is given in the tables below. If further facts are desired regarding any particular model or its application to a specific heating case, your Iron Fireman dealer will gladly work with you.



DE LUXE MODEL

RADIATION CAPACITY			
Iron Fireman Size	Warm Air Leader Pipe Area	E.D.R. Steam	E.D.R. Hot Water
DL20	1170	780	1255
DL30	1720	1145	1835
DL40	2340	1565	2507
DL60	3530	2350	3760
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,500 B.t.u. per pound, as received.			
OVER-ALL STOKER DIMENSIONS (ALL SIZES)			
Center line of retort to extreme front.....			78¾ in.
Hopper height.....			33 in.
Max. stoker width.....			21½ in.



JUNIOR 100 MODEL

RADIATION CAPACITY			
Iron Fireman Size	Warm Air Leader Pipe Area	E.D.R. Steam	E.D.R. Hot Water
Junior 75	4100	2720	4350
Junior 100	5500	3670	5900
Junior 150	7800	5200	8340
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,500 B.t.u. per pound, as received.			
OVER-ALL STOKER DIMENSIONS			
Center line of retort to extreme front..	Junior 75	Junior 100	Junior 150
	80 in. short model	82 in. short model	85 in. short model
	98 in. long model	100 in. long model	103 in. long model
Hopper height.....	39¾ in.	39¾ in.	39¾ in.
Max. stoker width...	25 in.	25 in.	25 in.

Domestic Stokers (Anthracite)

IRON Fireman automatic anthracite burners are made in two types—ash-removing and non-ash-removing. Both types have been officially approved by the Anthracite Institute.

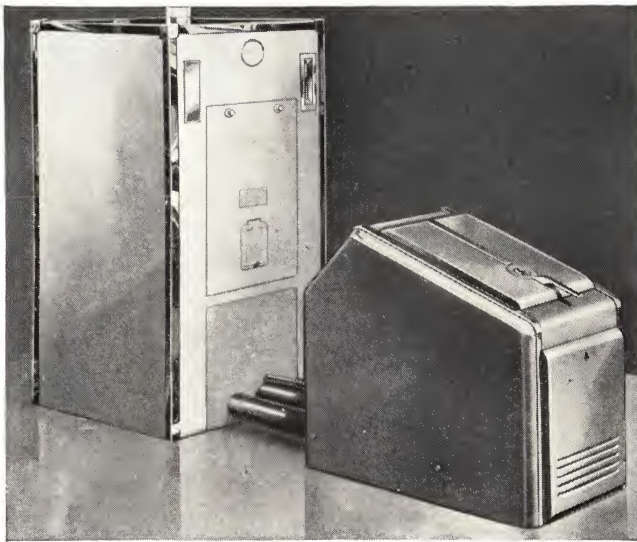
Either type is quickly installed in residential hot water, steam, vacuum, or warm air heating plants. Installation may be front, side, rear, or at an angle.

These machines have been designed for the efficient burning of those grades of anthracite coal known as Buckwheat, Rice, and Stoker Rice.

In the *non-ash-removing* Iron Fireman anthracite burner, ashes are removed from the ash pit manually at periodic intervals.

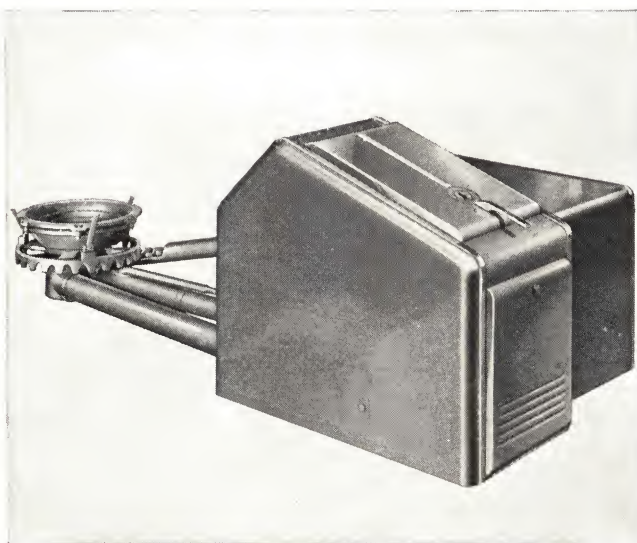
In the *ash-removing* model, ashes are removed from the furnace automatically and deposited in dust-tight receptacles.

Detailed information on both models is given in the tables below. If additional facts are desired, please consult your Iron Fireman dealer.



MODEL DLA (NON-ASH-REMOVING)

RADIATION CAPACITY			
Iron Fireman Size	Warm Air Leader Pipe Area	E.D.R. Steam	E.D.R. Hot Water
DLA-20	980	650	1040
DLA-35	1710	1140	1820
DLA-50	2440	1625	2600
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,000 B.t.u. per pound, as received.			
OVER-ALL STOKER DIMENSIONS (ALL SIZES)			
Center of retort to extreme front.....			78¾ in.
Hopper height			33 in.
Max. stoker width.....			21½ in.



MODEL DLAA (ASH-REMOVING)

RADIATION CAPACITY			
Iron Fireman Size	Warm Air Leader Pipe Area	E.D.R. Steam	E.D.R. Hot Water
DLAA-20	980	650	1040
DLAA-35	1710	1140	1820
DLAA-50	2440	1625	2600
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,000 B.t.u. per pound, as received.			
OVER-ALL STOKER DIMENSIONS (ALL SIZES)			
Center line of retort to extreme front.....			78¾ in.
Hopper height			33 in.
Max. stoker width.....			37¼ in.
(Including ash cans)			

Stokers for Heating or Power Boilers up to 300 Hp.

THE IRON FIREMAN MANUFACTURING CO. is the pioneer in its field, and the largest manufacturer of stokers for heating or power boilers up to 300 hp.

The leadership of Iron Fireman in this boiler range is based on sound engineering and construction, adequate research facilities to make constant improvement in the line, a nation-wide sales and service organization,

and excellent performance records in thousands of plants.

Iron Fireman commercial and industrial stokers are designed to burn efficiently the bituminous grades of coal known as Mine Run, Nut, and Slack. Installation can be quickly made.

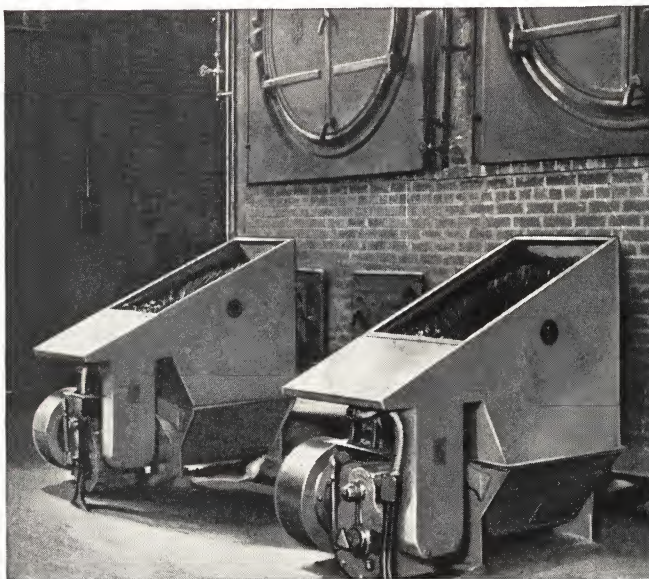
For Commercial and Institutional Heating and Small Industrial Power



NO. 3 INSTALLATION

LOAD CARRYING CAPACITY				
Iron Fireman Size	Heat Available at Boiler Outlet			
	B.t.u. per hour	Boiler hp.	Heating Load in Square Feet	
			E.D.R. Steam	E.D.R. Hot Water
No. 2A	1,200,000	36	5,000	8,000
No. 3 and No. 3D Poweram	1,800,000	54	7,500	12,000
No. 4 and No. 4D Poweram	2,700,000	81	11,250	18,000
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,500 B.t.u. per pound, as received.				
OVER-ALL STOKER DIMENSIONS				
	No. 2A	No. 3 and No. 3D Poweram	No. 4 and No. 4D Poweram	
Center line of retort to extreme front..	84¾ in. short model 102¾ in. long model	86¾ in. short model 104¾ in. long model	106¾ in. short model 118¾ in. long model	
Hopper height.....	48½ in.	48½ in.	48½ in.	
Max. stoker width...	30¾ in.	30¾ in.	30¾ in.	

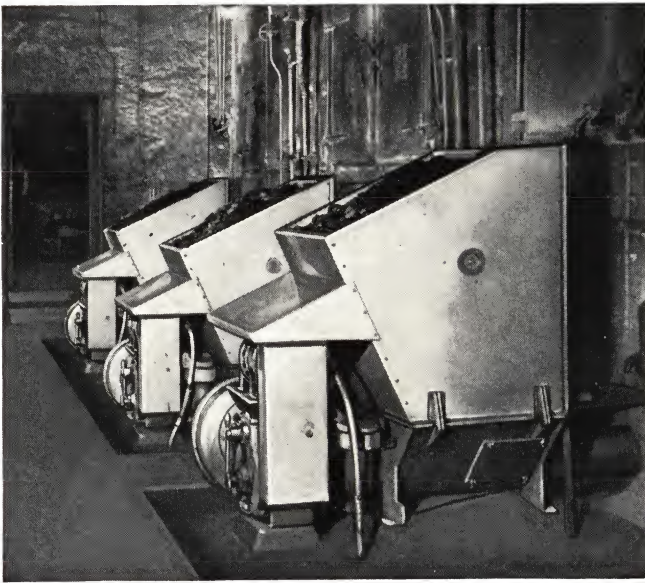
For Industrial and Large Heating Loads



NO. 4A INSTALLATION

LOAD CARRYING CAPACITY				
Iron Fireman Size	Heat Available at Boiler Outlet			
	B.t.u. per hour	Boiler hp.	Heating Load in Square Feet	
			E.D.R. Steam	E.D.R. Hot Water
No. 4A	4,200,000	125	17,500	28,000
No. 5	6,300,000	187	26,250	42,000
No. 5A	8,400,000	250	35,000	56,000
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,500 B.t.u. per pound, as received.				
OVER-ALL STOKER DIMENSIONS				
	No. 4A	No. 5	No. 5A	
Center line of retort to extreme front..	122¾ in. short model 134¾ in. long model	125¾ in. short model 137¾ in. long model	125¾ in. short model 137¾ in. long model	
Hopper height.....	66¾ in.	66¾ in.	66¾ in.	
Max. stoker width...	34 in.	36 in.	40 in.	

For Heavy Duty Industrial Power and Large Heating Loads



NO. 5CD INSTALLATION

LOAD CARRYING CAPACITY				
Iron Fireman Size	Heat Available at Boiler Outlet			
	B.t.u. per hour	Boiler hp.	Heating Load in Square Feet	
			E.D.R. Steam	E.D.R. Hot Water
No. 4ACD	4,200,000	125	17,500	28,000
No. 5CD	6,300,000	187	26,250	42,000
No. 5ACD	10,000,000	300	42,000	67,000

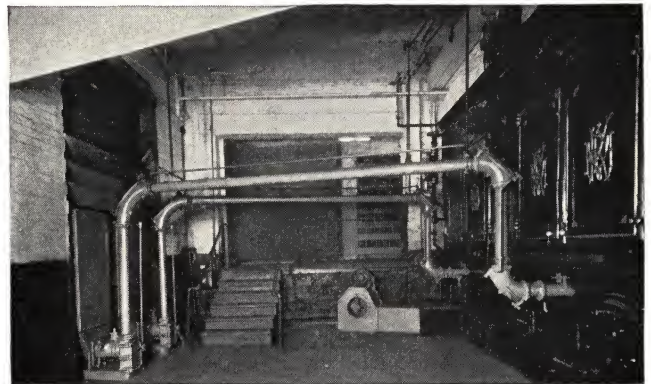
Maximum ratings shown are conservatively based on suitable stoker coal having a heat value of 12,500 B.t.u. per pound, as received.

OVER-ALL STOKER DIMENSIONS			
	No. 4ACD	No. 5CD	No. 5ACD
Center line of retort to extreme front...	126 $\frac{3}{8}$ in. short model 138 $\frac{3}{8}$ in. long model	128 $\frac{3}{8}$ in. short model 140 $\frac{3}{8}$ in. long model	135 $\frac{3}{8}$ in. short model 147 $\frac{3}{8}$ in. long model
Hopper height.....	66 $\frac{3}{4}$ in.	66 $\frac{3}{4}$ in.	66 $\frac{3}{4}$ in.
Max. stoker width...	34 $\frac{1}{4}$ in.	35 $\frac{3}{4}$ in.	30 $\frac{3}{4}$ in.

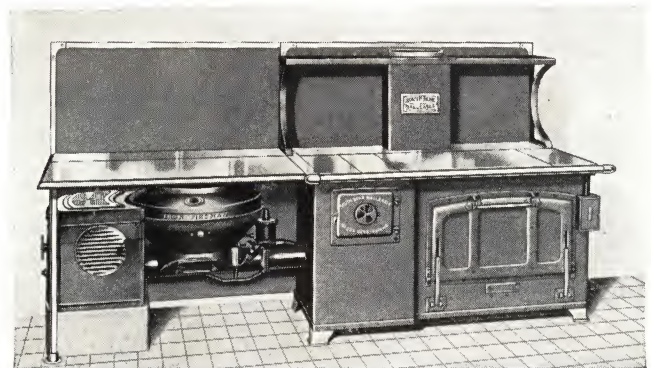
Iron Fireman Stokers for Special Applications

ARCHITECTS will readily appreciate that an Iron Fireman stoker can be easily adapted to special applications in addition to the orthodox heating or power job in buildings, institutions, and manufacturing plants. Because of its decade of experience in making and installing thousands of stokers under varying conditions and for all types of firing jobs, Iron Fireman has met and mastered the problem of special applications. In a catalog of this nature, however, it is impossible to cover the subject at length. For information in regard to special applications, consult your Iron Fireman dealer, or write to the Iron Fireman Engineering Department (see back cover).

A partial list of Iron Fireman special applications includes: Bake ovens (food), foundry core ovens, restaurant ranges, processing pots, kilns, dryers, annealing ovens, metal pots, etc.



IRON FIREMAN PNEUMATIC SPREADER STOKER FOR BOILERS
DEVELOPING UP TO 500 HP.

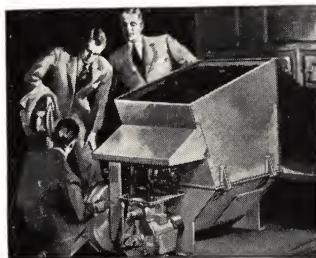


RESTAURANT: IRON FIREMAN INSTALLATION IN A COOKING RANGE

15 IRON FIREMAN FEATURES THAT

1. Balanced Design

The success of any machine is based upon the successful performance of every one of its parts. Like a chain, no machine is stronger than its weakest link. Every unit of the Iron Fireman is not only balanced and perfected in itself, but is also balanced in its relation to the other parts, and so makes the complete stoker a perfectly balanced operating unit.



2. Pressed Steel Construction

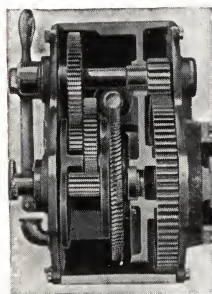


Pressed steel construction is the accepted standard for automatic coal burners as it is for refrigerators, automobiles and Pullman cars. This construction is strong, light, durable and crack-proof, largely because of the inherent advantages of this uniform material and the method of fabrication. Iron Fireman utilizes this construction whenever possible.



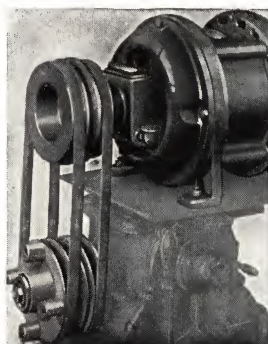
3. Iron Fireman Transmission

The Iron Fireman speed reduction unit and its patented speed change gears are an exclusive Iron Fireman development. This transmission drives the feed worm at a constant speed which in turn feeds the coal to the fire in a slow, steady stream at the required rate for proper burning. As a result, a steady, non-agitated fire is obtained. This transmission has three speeds and three neutrals. The gears can be shifted while the stoker is in operation; in fact more easily than when the stoker is idle, and it is impossible to strip the gears while shifting. All the gears operate in a bath of lubricating oil and the unit is most quiet. In design, materials and precision of construction, the Iron Fireman transmission is like that of a fine automobile.



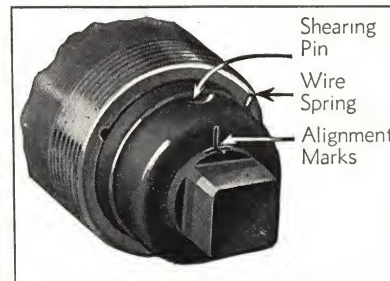
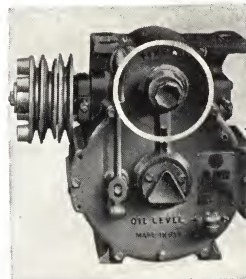
4. Duo-Purpose "V" Belt Drive

V-belt drives are the latest development in power transmission and they have many desirable qualities. They combine flexibility with ease of alignment, freedom from vibration, long life, and quiet operation. Iron Fireman uses this type of drive to obtain these desirable results and most models make use of an added V-belt application. They are equipped with two belts; one to drive the transmission and one to drive the fan, which rotates on ball bearings, independent of the main drive shaft. This makes a very flexible additional application, since the fan can thus be run at a speed independent of that of the feed worm transmission, and its air output can be exactly balanced to the amount of coal consumed.

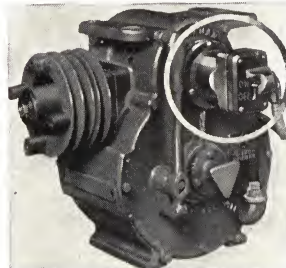


5. Safety Overload Device

Emergencies occasionally arise when an overload device is needed on a stoker; a railroad spike is sometimes thrown into the coal reservoir with the coal, finds its way into the feed worm, and may become lodged at the entrance to the worm housing. In such cases a safety shear pin automatically shears, thus giving positive protection to the stoker mechanism. It is a simple matter to remove the railroad spike or other foreign object on the rare occasions when it gets into the coal supply. The safety shear pin serves the same basic purpose as the ordinary fuse plug in an electrical circuit and it is just as easy to replace. While this simple overload device may never be needed, it continually stands guard against costly breakage and resulting boiler shutdown.



6. Shear Pin Alarm



For hospitals, greenhouses, or other applications where immediate attention must be called to an interruption of the fuel supply. When such interruption occurs, the shear pin alarm will stop the stoker and hold the fuel bed ready for service resumption announcing the emergency with bells or lights.

7. Centro-Balanced Rotor Fan



Air is supplied to the fire by a highly efficient centro-balanced rotor fan, especially designed by Iron Fireman engineers and produced in the Company's own plant. It is accurately balanced to eliminate vibration and is compact, durable and quiet in operation. The fan is inclosed in the pressed steel fan housing designed and made by Iron Fireman exclusively for Iron Fireman fans.

8. Automatic Fire Banking Damper

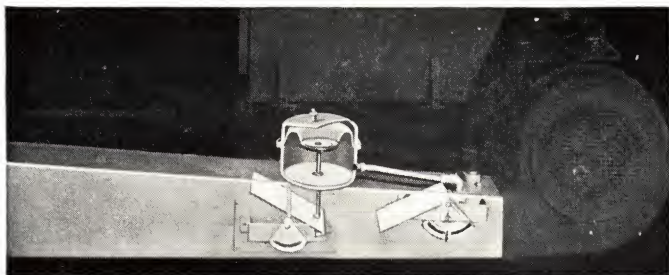
Located in the steel air duct, through which air moves from the fan outlet to the air chamber, is a device somewhat similar to a check valve. This acts as an automatic fire banking damper. When the stoker is in operation, this damper is held open by the flow of air, but automatically closes the air passage when the stoker stops. It thus holds the fire in the proper condition for good combustion when heat is again required, and between periods of operation conserves fuel by allowing the burning of only a minimum amount of coal in the banked fuel bed.



INSURE DEPENDABLE AUTOMATIC FIRING

9. Iron Fireman Volumeter

Automatic control of air volume in the combustion zone is obtained with the Iron Fireman Volumeter. Regardless of fuel bed conditions or the type of coal used, the Volumeter supplies exactly the amount of air needed for perfect combustion.



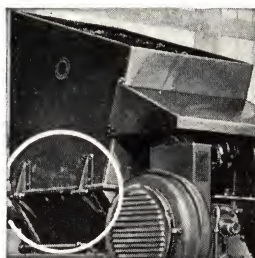
10. Pneumatic Fume Eliminator



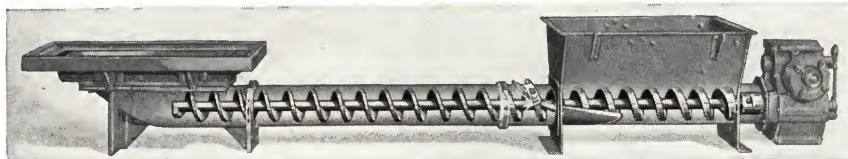
A small air intake is placed in the fan casing at the point at which the air leaves the fan with the greatest velocity. A small air duct connects this intake to an air injector placed at the firebox end of the worm housing. This device insures a stream of high pressure air flowing into the worm housing at all times, and thereby creates a positive movement of coal fumes through the fuel in the bottom of the retort. It prevents any fumes from flowing back through the worm housing to the fuel reservoir, thence into the furnace room.

11. Iron Fireman Coal Reservoir

The Iron Fireman coal reservoir is made of heavy gauge steel plate. It is scientifically shaped to facilitate free flow of coal to the feed worm. On the larger sizes, these reservoirs are attached by specially designed hinges. These hinges enable the coal reservoir to be quickly and easily removed or, should occasion arise, to be easily swung to one side or the other. On the domestic and smaller commercial models a gas-tight, dust-tight top is available for installations where extreme cleanliness is a factor.



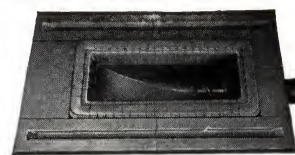
12. Iron Fireman Conveyor Screw and Worm Housing Cleanout



The conveyor screw is made of a special heat-resisting alloy steel by an exclusive Iron Fireman process. A one-piece pattern is used which is screwed out of the sand as a bolt is screwed out of a nut. Consequently, it is as true in size and shape as a fine carpenter's bit. The strength of the screw is far in excess of any working requirement. The worm flights and core are scientifically designed to feed coal evenly and with a minimum expenditure of power.

13. Iron Fireman "Carburetor"

The retort, venturi tuyeres and dead plates constitute the "carburetor" of the Iron Fireman. Within this carburetor, coal and air meet and are mixed in the proper proportion to obtain efficient combustion when they enter the heat zone. In this part of the stoker, design, material and construction meet the acid test. The retort on the larger sizes is made in sections which are especially designed to allow for differences in expansion due to heat. All of these parts are the result of years of development work by Iron Fireman engineers in the laboratory and in the field.



14. Iron Fireman Coal Distributor



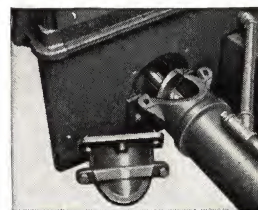
The kind of coal used or the kind of load to which Iron Fireman is applied may require a slightly agitated, evenly distributed fuel bed low in height. The heavy duty Iron Fireman fulfills this requirement without sacrificing the large hopper and compact mechanism features for which Iron Fireman is famous. After the feed worm conveys the coal to the retort, the auxiliary mechanism distributes the coal uniformly into the combustion zone.

15. Iron Fireman Automatic Controls



With sensitive, accurate, automatic controls, Iron Fireman operation is closely governed to the time, temperature, or pressure requirements of the load it is serving. Because Iron Fireman pioneered this field, Iron Fireman first encountered the peculiar requirements of automatic firing control. Now many necessary control features are patented to Iron Fireman exclusive use.

Foreign matter which may find its way into the coal and obstruct the operation of the stoker is led up to the worm housing cleanout, from which position it can be readily removed without damage to the stoker or delay to the operation.





IRON FIREMAN ENGINEERING SERVICE

The material in this catalog on Iron Fireman stokers for residential heating, commercial and industrial heating or power, and special applications is of necessity somewhat general in nature. However, it should prove to be sufficiently comprehensive to enable the architect to identify the model that seems best suited to fit his particular needs.

Where this catalog stops, Iron Fireman Engineering Service begins. This service is nationwide in scope and is available through the hundreds of factory-trained dealers who are located in all principal cities in the country. This service is at your disposal. It represents the experience and practical heating information gained through servicing thousands of boiler rooms and heating plants in all parts of the country.

In addition to the field engineering organization of Iron Fireman dealers, the services of specially trained factory engineers are available. They are equipped to furnish you counsel and detailed information that will result in your securing an installation that will give maximum



performance and years of trouble-free service. The services of these men can be secured without cost or obligation. Address the nearest Iron Fireman factory. Iron Fireman Manufacturing Company, Cleveland, Ohio; Portland, Oregon; Toronto, Canada.

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*See Sweet's Catalog File—Engineering—for detailed
information on Iron Fireman models for commercial
and industrial heating and power applications*